The Water Report™
Water Rights, Water Quality & Water Solutions in the West

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& More!

RESTORING A WORLD CLASS AQUIFER

A BRIEF HISTORY BEHIND MANAGED RECHARGE & CONJUNCTIVE MANAGEMENT FOR IDAHO'S EASTERN SNAKE PLAIN AQUIFER

by Noah Stewart-Maddox, Paul Thomas, William Parham
(Idaho Water Resources Research Institute, University of Idaho)
&
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Introduction

THE EASTERN SNAKE RIVER PLAIN AQUIFER

The Eastern Snake Plain Aquifer (ESPA) underlies the Eastern Snake Plain in the southeastern portion of Idaho and is one of the world's largest and most productive aquifers. The ESPA covers 10,800 square miles of semi-arid plains surrounded by mountains. A key feature of the area is the Snake River, entering from the ESPA's eastern boundary northeast of Idaho Falls, Idaho, and carving its way along the southern boundary of the aquifer (*see* Map, page 2). The aquifer and river have been critical to the economic development of the area and the transformation of the Eastern Snake Plain from semi-arid plains into the breadbasket of Idaho.

Some key statistics demonstrate the importance of water in this area:

- Approximately 2.1 million acres are irrigated across the ESPA (60% of the State's total irrigated acres)
- 50% of Idaho's power needs (IWRB, 2009) are in the area
- Over 70% of trout production in North America (NASS, 2018) occurs in the area
- Fourth largest milk producer in the United States (United Dairymen of Idaho, 2017) is located there
- The Magic Valley, was ranked as a top 12 US manufacturing community and ranked in the top third of the US for food processing (Industry Week Magazine, 2015).

In 2012, the area covered by the ESPA accounted for 33% of all goods and services produced in Idaho, some $14.9 billion dollars annually (*see* Division of Financial Management, 2012). Through a combination of farming, agriculture related business, food processing, dairies, aqua-culture facilities and other industries this area accounts for 21% of the **g**ross **d**omestic **p**roduct (GDP) of Idaho (IDEQ, 2005). The Snake River Basin also provides the water supply for 76% of Idaho's population (IWRB, 2012).

The ESPA and the Snake River are intricately linked. The majority of surface water in the area originates as snowfall from high elevation mountains surrounding the Eastern Snake Plain. Historically, the streams surrounding the Eastern Snake Plain and some areas of the Snake River naturally added water to the ESPA. The aquifer then returns a significant amount of water back to the Snake River through spring discharge. As the area was developed in the early 20th century, the aquifer was augmented with seepage from unlined canals and irrigated farm fields via incidental recharge. This resulted in an increase in aquifer water levels and spring flows to the Snake River (*see* Figure 2, page 3).

Business of Water

THE BUSINESS OF WATER

WRRC CONFERENCE EXAMINES ON THE BUSINESS OF WATER

by Susanna Eden, Jacob Petersen-Perlman, & Victoria Hermosilla,
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Introduction

The 2018 University of Arizona Water Resources Research Center's annual conference, *The Business of Water*, explored multiple issues at the intersection of business and water, including: public-private partnerships; water transactions; the interests of business in water stewardship; and the relationship of water and the environment to economic development. This conference brought together more than 350 people involved in the water world and featured experts from business, utilities, and government, philanthropic organizations, and non-profits operating in the state of Arizona and beyond. This article summarizes the issues discussed at the conference, with an examination of: the foundational value of water; partnerships that take advantage of complementary strengths; water transactions; and ethics and social responsibility.

Creative Collaboration

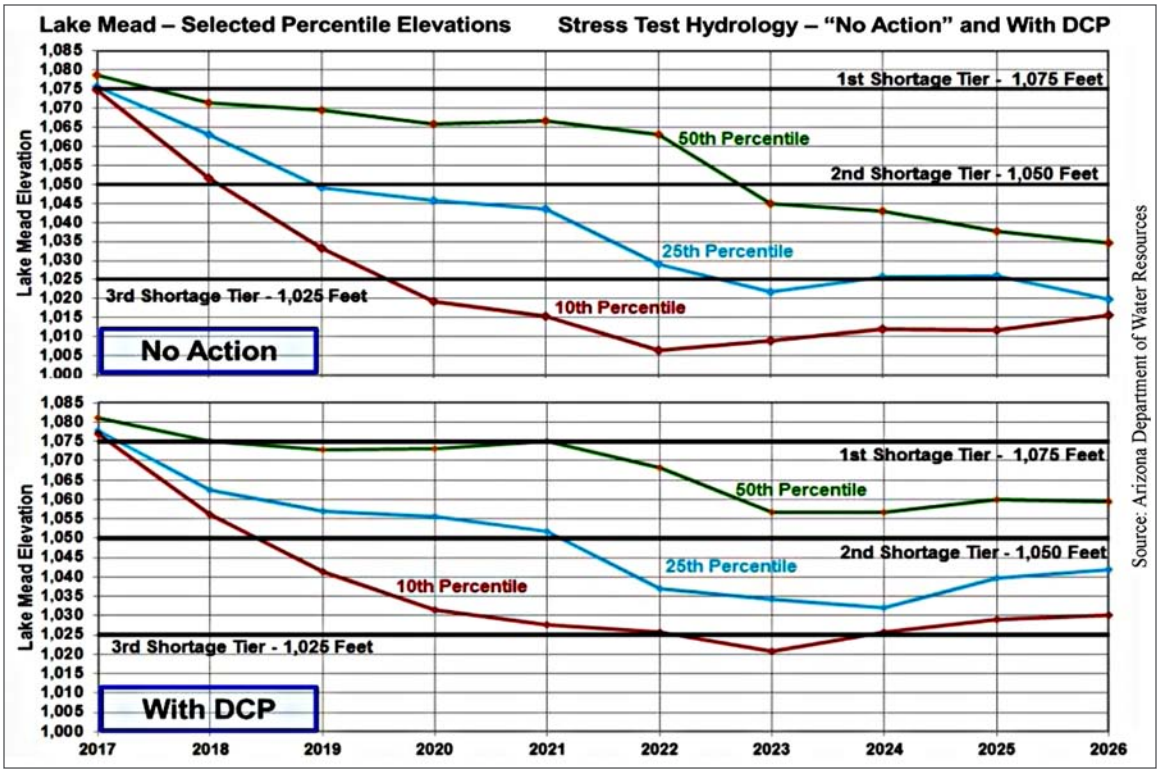
Collaboration Payoffs

Attendees heard from experts on a diverse range of subject matter and found many commonalities among presentations. Topics including the need for creative collaborations and responsible stewardship of financial and water resources provided recurring themes. Speakers emphasized that though collaborations may be difficult, the payoffs — including: increased water security; diverse water portfolios; robust sharing and trading relationships to flexibly adapt to system changes; and better understanding among all parties — are well worth the hard work. The lesson emerged clearly that in a world of limited resources, inclusive and innovative approaches to water management are imperative.

Drought Mitigation (Colorado River)

In the Colorado River Basin, for example, creativity and collaboration are essential to averting serious shortages. Tom Buschatzke, Director of the Arizona Department of Water Resources (ADWR), pointed out that the probability of a Colorado River shortage is close to 50 percent by 2020. Obviously, this is something that Arizona and the other basin states wish to avoid. The States and major water users have been negotiating drought mitigation strategies for several years with some successes. Buschatzke emphasized the importance of completing negotiations on a Drought Contingency Plan (DCP). He noted, however, that there have been delays in completing the DCP. Delay may mean that the opportunity for conserving Mexican water to Lake Mead is lost. Delay also has an impact on the decisions companies are making about doing business in Arizona; an impending water shortage discourages business investment. Arizona is partly responsible for the delay because the State has not been speaking with one voice. Buschatzke stressed the need for Arizona to find a unified voice. [See Buschatzke Interview, *TWR* #149].

Drought Contingency Plan (DCP)



Business of Water

Water Essential

Efficiency & Productivity

Infrastructure Valued

Supply Security

Leasing & Storage Credits

Water & Economics

Risks

Water-Based Recreation

The presentations and panels that preceded Buschatzke's remarks delved into how successful collaborations are structured and what has been learned from joint problem-solving experiences. Successes and challenges were examined and recommendations were offered. As a result, *The Business of Water* shifted the focus on water resources to reveal a new picture of a familiar scene.

The Foundational Value of Water

Water is fundamental to life. Farms, industry, recreation, and community could not exist without water. Statements regarding the foundational value of water set the tone for the day. University of Arizona College of Agriculture and Life Sciences Dean Shane Burgess observed, "Without water, there would be no business." University of Arizona President Robert C. Robbins expanded on this principle, noting that "water is a major opportunity and a major necessity."

Ian Lyle, Executive Vice President of the National Water Resources Association, noted water's foundational role in the national and global economy. Lyle said, "Agriculture relies on water. Ecosystems rely on water. Industry relies on water. The economy relies on water." The western United States needs a stable supply of water, not just for the West, but for the country and the world. Taking irrigated agriculture only, the US provides 20 percent of the world's food production in exports and the need for food will grow 70 percent by 2050. This need will have to be met by a combination of increased agricultural productivity and increased water use efficiency. Lyle reminded the audience that federal infrastructure investment was considered a value by the Founding Fathers, and the US Bureau of Reclamation (Reclamation), which constructed water projects throughout the West, was founded to make the West bloom.

The connection between water and the economy was expanded upon by the City of Phoenix's Nathan Wright (Program Manager, Community and Economic Development). Wright noted that the City often hears concerns about drought and Colorado River shortages from outsiders, who must be convinced that Phoenix has a secure water supply. The City of Phoenix has had a master water plan in place for over 40 years and its water, planning, and development departments work closely to align water strategies with economic action plans. Although they have attracted industries that are heavy water users, such as the semiconductor industry, they have considered the water supply in their industry recruitment; for example, advanced manufacturing cleans and recharges 50-90 percent of water used into the underlying aquifers.

Beyond supporting economic development, water supports other community values. Stephen Roe Lewis, Governor of the Gila River Indian Community (GRIC) in Arizona, discussed the importance of the secure allocation of water the Community receives because of the 2004 Water Settlement Act. This water is allowing them to restore their agricultural heritage and their cultural connection to the Gila River, in conjunction with building the economic strength to improve conditions for community members. The settlement includes funding for a water delivery system — the Pima-Maricopa Irrigation Project (PMIP), which is the largest in the country — for tribes. Under the GRIC water plan, PMIP will be built out in 2027-28. Until then, the Community is looking for fund-raising mechanisms, such as leasing water and marketing water storage credits, to help achieve their long-term goals. Establishing market mechanisms will allow them to supplement federal funding for their agricultural development, as well as meet other community needs. The GRIC's combination of economic and cultural aspirations is exemplified by Ramona Farms, which has been bringing back traditional crops — including tepary beans, wheat, and corn — and selling products to gourmet restaurants.

Corporations may have a different set of aspirations, but water still has major impacts. Ted Kowalski, Senior Program Officer for the Walton Family Foundation, discussed how businesses need clean, reliable water to succeed, and how environmental health goes hand-in-hand with economic health.

Todd Reeve, Chief Executive Officer of the Bonneville Environmental Foundation, also spoke about the link between high quality water supplies and economic health. Reeve noted that the value of water's many uses — such as for ecosystem services, power generation, and commercial goods — can be measured in monetary terms. "All businesses are affected by water," he said, "whether a small-sized business or a Fortune 500 company." Further, he pointed out that businesses were responding to increasing water-related risks, including: toxic algal blooms, which have affected tourism in Florida and commerce in the Great Lakes; wildfires, which endanger lives and property; and decreasing water supplies, which threaten future viability. Some businesses mitigate these risks as responsible members of the communities in which they operate. He stated that when corporations help the environment and contribute to improving the state's water quantity and quality, they are helping themselves at the same time. In Arizona, businesses assess water risks associated with locating to the state as a part of their risk assessment processes. Some companies with vested interests in Arizona have demonstrated leadership by supporting innovative projects employing new technologies and voluntary agreements that make the most of Arizona's limited water resources.

The economic life of small towns in rural Arizona may also depend on their water resources. Sustainable water-based recreation has been a boon to the town of Clarkdale, Arizona. Doug Von Gausig, Mayor of Clarkdale, spoke about collaborative efforts made by his town and other communities in

Business of Water

Eco-Tourism

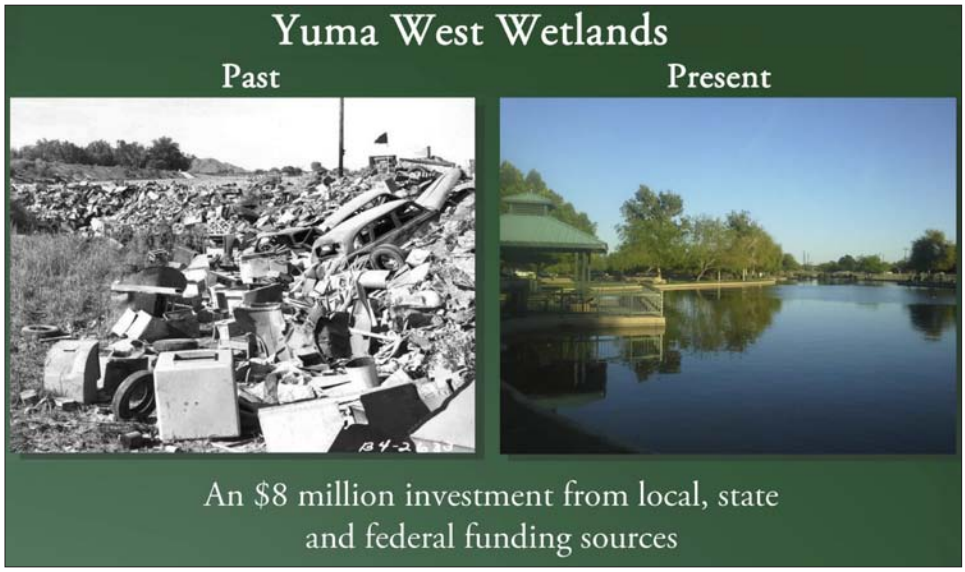
Riparian Restoration

Arizona's Verde Valley to bring recreational opportunities to the Verde River. In the past, the Verde River suffered from pollution coming from the smelters near Jerome, Arizona. Although this industrial activity made worthwhile contributions to the Arizona economy, it led to significant environmental damage, according to Von Gausig. By 1953, there was "no greenery of any kind" on the Verde River. Today, the Verde River supports a healthy ecosystem with stable flows and excellent water quality. The river attracts thousands of kayakers, hikers, birders, and eco-tourists every year. National Geographic now lists the Verde Valley as an ecotourism destination.

Three hundred miles southwest in Yuma, Arizona, riparian restoration revitalized a derelict section of the city. Charles Flynn, Director of the Yuma Crossing National Heritage Area, described how Yuma came up with a common plan for voluntary development of the Yuma Crossing Natural Heritage Area. The effort involved federal, state, and local funding, including $30 million in private investment. The project removed salt cedar and *Arundo donax* (giant reed) from over 400 acres and planted 250,000 cottonwood and willow trees. Benefits have included integrated commerce and recreational waterfront development and possible National Park status for the Yuma Crossing area.

Adapted from Charles Flynn's Presentation

Contrasted Conditions Before & After Public/Private Yuma Crossing Restoration Project



Colorado River Delta (Acquisitions)

River restoration can increase prosperity in affected areas, according to Yamilett Carillo, Director of the Colorado River Delta Water Trust and the "Restauremos El Colorado" program. The program's mission is to secure instream flows for the Colorado River via permanent and temporary water acquisitions and to help restore critical riparian and wetland habitats in the Colorado River Delta in Mexico. The program does this through a water trust which acquires permanent and temporary water rights on behalf of non-governmental organizations working in the Delta. Carillo said the Trust receives donations from both the United States and Mexico, utilities, and non-profits to work on restoration and conservation. Activities undertaken so far have demonstrated the positive impact on river communities through job creation and improved ecosystem health.

Getting Things Done

FINANCING, PUBLIC-PRIVATE PARTNERSHIPS AND OTHER COLLABORATIONS

Infrastructure Investment

One of the more robust topics of discussion throughout the conference was how collaboration among multiple partners is driving infrastructure investment and development. Infrastructure requires large capital investment. In years past, large water works projects were funded by the federal government. According to Ian Lyle, Reclamation has put forward a total of approximately $20 billion of capital investment money for projects like dams and canals. These Reclamation projects constructed in the past now return approximately $20 billion in economic benefits annually. While by this accounting Federal investment in water infrastructure is good policy, it is increasingly difficult to procure, given the on-going congressional stalemate in dealing with federal budget challenges. This retrenchment in federal funding has consequences for water and wastewater projects.

Retrenchment

"P3s"

Public-Private partnerships (P3s) make use of private sector capabilities to achieve public infrastructure goals for a return that satisfies private sector needs. Rod Smith, President of Stratecon, Inc., described the traditional view in which the private sector focused on short-term returns and profits, while the public sector was concerned with the long-term. According to Smith, the role of the private sector is fundamentally different today, incorporating longer-term goals in its decision-making processes while maintaining flexibility and creativity. They are able to take a lead role in developing projects because they do not have the political and institutional constraints of a public body.

Longer-Term Goals

Business of Water

Funding Gap

Desalination Project

Supply Diversification

Public/Private Structure

"Speed of Business"

Partnership Needs

Chris Higgins of Goldman Sachs spoke about how the private sector can help with investments in infrastructure projects. Highlighting the extent of the problem, he cited a recent assessment that found a 70 percent funding gap for water and wastewater projects. He noted that many cities and towns lack sufficient capital or the ability to quickly raise it through a tax or fee on residents. In addition, some cities and towns may be reluctant or unable to issue bonds on expensive construction projects. The private sector can make significant capital investments to help municipalities and local entities address these problems.

The first example of a successful P3 process presented at the conference was the Carlsbad Desalination Project. In Higgins's description, San Diego needed to diversify its water portfolio in the 1990s, but the water utility did not want to associate itself with the high financial risk of funding a desalination project. The Carlsbad P3 agreement put the construction and operations risk of the project on private investors. The San Diego County Water Authority (SDCWA) did not want to risk their AAA bond rating, so debt was issued on the private partner, Poseidon, with its BBB rating, resulting in a higher interest rate. The plant required a $900 million investment, and began producing water for a cost of $2,100 - $2,500 per acre-foot. The SDCWA was willing to pay for this to protect the ratepayers from risk. Investors were willing to take on the construction risk for secure returns once the plant was constructed and brought on line.

As a second example, Mike Irlbeck, Director of Business Development for EPCOR Water, spoke about how San Antonio diversified their water portfolio by importing water through a 140-mile pipeline from Burleson County. Irlbeck said that a great deal of interest exists in the private sector to find safe, low-return investments, particularly in the water sector. The City of San Antonio, like many municipalities, wanted to avoid the financial risks associated with carrying out a large, expensive project, whereas the private sector could be nimbler and more creative in dealing with political and institutional challenges. Similar to the Carlsbad P3, the Vista Ridge Project employed a partnership agreement structured such that the private sector handled managing the risk, acquiring permits, and doing the engineering. They were also responsible for securing the supply, while the public sector was responsible for repaying the costs. The project resulted in delivery of 50,000 acre-feet of water to San Antonio from 18 production wells. The total investment was over $900 million to be repaid by the city over 30 years. After 30 years, ownership of the facilities will be transferred to the city. This arrangement suited the capabilities and needs of both the public and private sector partners.

As a preface to his P3 examples, John H. Moffatt, Economic Development Director of Pima County, Arizona, talked about how the P3 process speeds up project development and completion. He noted that private-sector partners are accustomed to performance-based work because many repayment contracts are performance- or results-focused. According to Moffatt, private-sector partners understand if they don't provide a quality asset, they are unlikely to get paid for it. In the example of the award-winning Agua Nueva Water Reclamation Project, "working at the speed of business" allowed the project to come in under budget and eight months early.

Agua Nueva Water Reclamation Facility / Built through a P3 process by Pima County and private partners

All three P3 examples illustrate that the partnership needs to work for all partners involved. Private-sector partners need to feel secure about the return on their investments, and public-sector partners need to feel that the infrastructure will function well over the long-term. While private-sector partners need a return that balances their risk/reward function, public-sector partners need an asset that functions to effectively achieve its public purpose.

Business of Water

Incentive Payments

Sustainability Goals

Another kind of partnership between cities and the private sector involves how cities attract new businesses. Cities that understand the importance of water sustainability, like Tucson, Arizona, are including requirements for water conservation in their business incentive programs. Timothy Thomure, Director, Tucson Water of Tucson, Arizona, discussed the city's Water Infrastructure Initiative (WII). The WII aims to support development in targeted areas of the community that currently lack water infrastructure. The program conditions the receipt of incentive payments on meeting sustainability criteria. WII Projects must meet three of the following six sustainability goals:

- Sustainable building practices (LEED Silver or higher)
- Minimize potable outdoor water use (After a three-year establishment period, outdoor water use must be 100 percent harvested rainwater or 100 percent sustainable reuse)
- Minimize potable indoor water use
- Increase the urban tree canopy by planting native and/or desert-adapted trees for 25 percent of all non-roof areas over a 10-year establishment period
- Provide alternative transportation incentives that are available to 100 percent of employees and exceed typical standards
- Support a sustainable workforce, where 50 percent of the workforce is employed in green jobs and includes military veterans or those re-entering the workforce after incarceration

In exchange for businesses locating in a WII area, Tucson will offer up to $2 million per project.

Building Relationships

As Todd Reeve, Bonneville Environmental Foundation, observed, many partnerships are the result of building relationships where interests intersect. Taylor Hawes of the Nature Conservancy spoke about building relationships among many partners with the common goals of sustainability and viability of a water resource and the natural and human communities that depend on it. In these circumstances the partners see their relationship as "stepping into battle" along side each other instead of battling against one another. Multiple partners can bring a variety of skillsets to the process of getting things done. Reeve added that there are many solvable challenges that philanthropic organizations can tackle and are already tackling. Several businesses are funding non-profit projects, as well as taking part in volunteer work along riparian areas, or retrofitting their businesses to include more environmentally friendly features.

Von Gausig, who is also Executive Director of the Verde Institute, spoke about his push to improve the culture of neighborliness along the Verde River. Through increased public engagement and the flexibility of local leaders, the Verde River has not only increased its visibility as an eco-tourism destination, but also increased interest from more partners who want to engage in the community in more ways.

Transactions

CHALLENGES AND NEW APPROACHES

Moving Water

Session moderator David Wegner, Senior Scientific Consultant at Jacobs Engineering, defined "water transactions" succinctly as "how we move water." He also noted that the process can be either peaceful or contentious. Normally, water transactions involve an exchange between willing participants in which one party has water and another needs water, but this simplicity hides a multitude of challenges.

Shaky Status Quo

According to Peter Culp, Partner in Culp & Kelly, LLP, "Everybody loves to hate water transactions" because moving water rights from one place to another has been seen as a zero-sum game. Culp went on to explain that in the West, the legal doctrines of prior appropriation (first in time, first in right) and appurtenancy (right being tied to the land), combined with the history of water development, means that water rights are frequently attached to outdated locations. These locations tend to be where people were farming, building, or living in the past, not necessarily where economic pressures are driving economic activity today. The "no harm" or "no injury" rule (other rights holders on the same river may not be harmed by a transaction), anti-speculation provisions, and "use it or lose it" incentives are all part of the Prior Appropriation Doctrine and are barriers to moving water. Rules also prevent water saved through conservation from being put to other uses. In addition, physically moving water is expensive, so transactions tend to take place where infrastructure already exists; that is, locally. Furthermore, moving water from one place to another may threaten the viability and future development of communities on the losing end of a water deal. Intense concern about what happens if water is moved away leads to a defensive reaction: "They are coming for our water!" Culp also stated that most riparian areas in the West have been damaged in some way or eliminated, and moving water can make these compromised areas better or worse.

Barriers

Inertia Impacts Value

All of this tends to keep water where it is, which leads to disparities in the value of water use according to Culp. Water gets stuck in relatively low value uses, while higher value uses are limited by a lack of water. Water used in one place to produce crops may cost $100, while 50 miles away the same quantity of water applied to residential, commercial, or industrial uses may cost $1,000, $10,000, or upwards of a million dollars to produce semi-conductors.

Business of Water

"Green Infrastructure"

Crop Switching

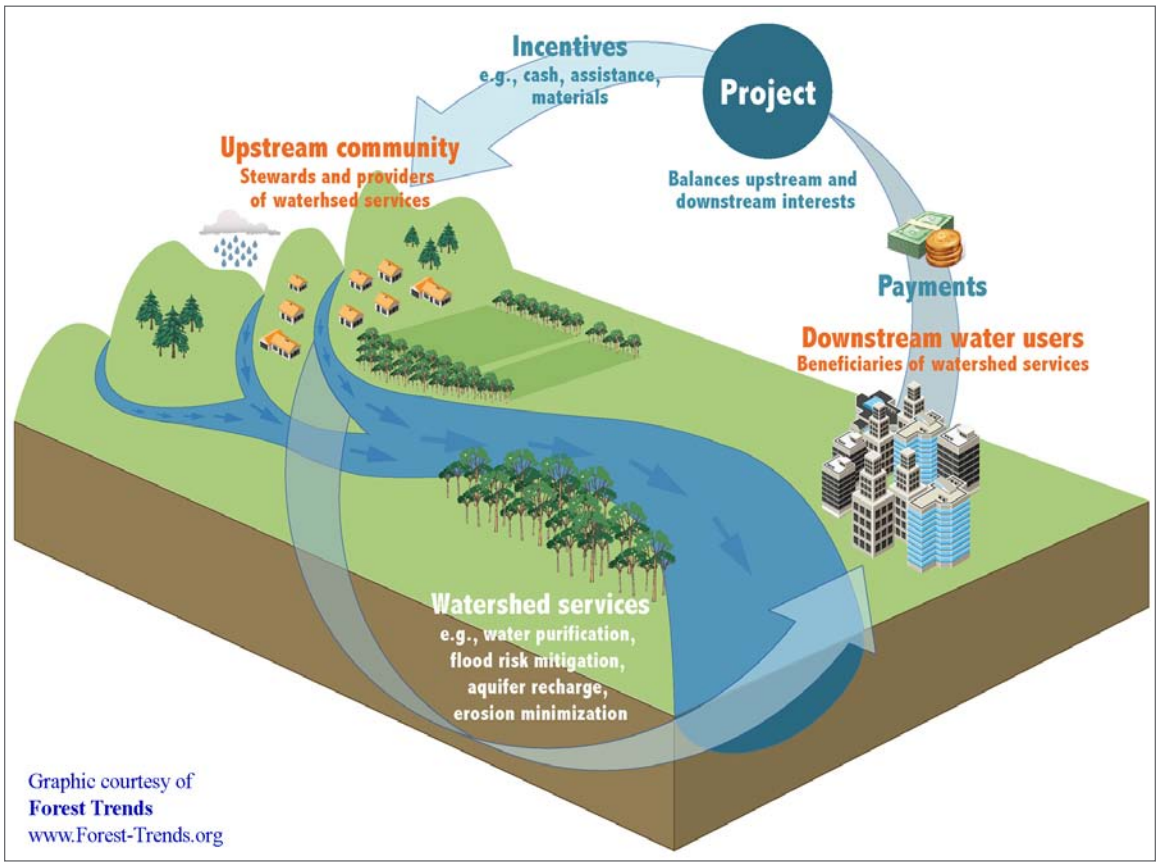
Voluntary Reductions

Incentives & Payments

Tribal Water Transactions

In addition, federal reserved water rights (rights reserved for federal purposes) are linked with the historic treatment of Native Americans. Realization of federally reserved Indian water rights has become a priority. Culp expressed his belief that although change is very hard, it is also inevitable. The pressure of growing scarcity and growing uncertainty will override barriers. There are also many new kinds of transactions that go far beyond the zero-sum game model.

Culp's vision for the future of water transactions involves improvements by cities to protect existing water sources and looking at ways to use "green infrastructure" to make the most of local rainwater. Transactions will look more like investments than trades. Improved efficiency can open opportunities for sharing water supplies and costs. One strategy encourages agricultural crop-switching by developing processing and distribution infrastructure and setting up new markets for low water use, high-yield crops — an example could be investing in a malting facility to encourage the switch from forage to barley. Solutions are flexible and do not result in permanent transfer of water away from the land. In many cases, water savings can be produced much more cheaply than simply paying growers to shut down. The Pilot System Conservation Program for the Colorado River put together a fund with contributions from some of the major water agencies in the basin to compensate water users for voluntary reductions in water use. The program's goal is to reduce water use and increase water storage in Colorado River reservoirs. Reactions have been generally positive, with many water users seeming to be amenable to voluntary compensation reduction. In Culp's opinion, these mechanisms are worth thinking about.



New approaches to water transactions will undoubtedly involve Native American tribes. Gila River Indian Community (GRIC) Governor Lewis emphasized that tribes will play a major role, not just as participants, but also as guides to development. Tribes bring a unique perspective that can influence state-wide and basin-wide planning. Most tribes would rather use all their water on their land according to their needs and values, but in the short term, some tribal water can be turned into funding for essential infrastructure, other tribal government purposes, or an important public purpose, such as protecting storage in Lake Mead.

Lewis laid out three categories of water transaction:

1) Acquisition: acquiring water rights through sale or lease
2) Forbearance: being paid not to use rights
3) Exchange: swapping water from one source for water from another

Exchanges may occur with or without payment. The GRIC's water marketing includes all three categories.

Business of Water

Tribal Marketing

Lewis explained that while tribes cannot sell their reserved water rights, they can enter into leases provided that their congressionally approved water settlements allow it. Tribes without the right to lease water are limited to on-reservation marketing or may be able to enter into forbearance agreements. More recent settlements have more flexibility; they include tradeoffs to market water to generate revenues. Future costs associated with the delivery of their Central Arizona Project (CAP) water motivated the GRIC to begin actively looking at innovative ways to market the community's water. As Lewis said, "Currently, we cannot use all of our waters on our lands. By marketing our water, we can generate revenue and address rising costs."

GRIC Governor Stephen Roe Lewis

The GRIC's experience with water marketing can be divided into two main periods, defined by Lewis as before and after water settlements were enacted. Before reaching settlement, non-Indians often needed tribes to lease back their rights and Non-Indian negotiators applied a kind of political extortion that all tribes have to confront when seeking a settlement. Post-enactment, the GRIC continues to market their water, but with much more flexibility and creativity.

Lewis maintained that most tribes do not like long-term leases (e.g., 100 years) because the ability to use leased water is lost for multiple generations. There can be advantages over short-term leases, however, as short-term leases have high transaction costs due to the need for multiple federal approvals.

Alternatives to leasing include the sale of **l**ong-**t**erm **s**torage **c**redits (LTSCs) generated under rules set forth in Arizona's Groundwater Management Code. Lewis recounted GRIC experiences with LTSCs. "Before the Community had its water settlement, we didn't see eye-to-eye with Salt River Project (SRP). After settlement, the Community decided to go into marketing aggressively. We needed a partner and saw commonalities with SRP. Together we formed the Gila River Water Storage LLC, which stores water off the reservation now but will store more on the reservation. …We've created in this process almost 1.5 million credits since 2010 and have sold over 200,000 of those credits." Lewis characterized their new relationship as a great partnership. [See *Gila Water Storage*, McJunkin, *TWR* #130].

Exchanges are another option described by Lewis. The GRIC sold credits to users who could not recover them because of poor groundwater quality. To solve this problem, the GRIC entered into a separate agreement in which the credits are recovered on GRIC lands for their use, and in return they deliver an equal amount of water to the credit purchasers. This helps to reduce costs for both parties.

Settlement Flexibilities

Lewis remarked that water marketing in Arizona is in nascent state. Costs to acquire water will rise and financing will be a challenge. Arizona needs flexibility to move water around the state. Governor Lewis suggested that his father, the groundbreaking water attorney Rod Lewis, would say that — given the opportunity and flexibility provided by water settlements — tribes can be sophisticated, equal partners and have the opportunity to build systems to address these issues.

The City of Phoenix has also engaged in several water transactions in the past few years and Cynthia Campbell, Water Resources Management Advisor for the City, enumerated the lessons learned and provided examples of the City's creative approach.

Water-for-Water Transaction

The first lesson is that a water transaction is not necessarily money for water. The City's transactions have facilitated the management of water to be available when and where it is needed. A good example described by Campbell is the exchange between Phoenix and Tucson that moves water through time by storing water in Tucson recharge projects. Phoenix entrusts some water to Tucson to be put in the ground with the goal of future water use in Phoenix. When the water is needed in the future, such as when there might be a shortage, Phoenix pumps the water through Tucson's recharge recovery wells and Tucson uses it. At the same time, Tucson accepts delivery of part of their Central Arizona Project (CAP) water through a diversion that directs the water to Phoenix and Phoenix uses that water, in a water-for-water transaction. Metropolitan Water District, a Tucson-area water provider with available recharge capacity, has a very similar agreement with Phoenix.

Water Exchange

In a second example, the City of Avondale, which is located in the southwestern part of the Phoenix metropolitan area, entered into a water exchange with City of Phoenix. Avondale relies on wells and wanted to make use of its CAP water to preserve the aquifer, but lacked the infrastructure to transport the water from the CAP canal. The City is too far from the canal to feasibly construct its own diversion canal. Phoenix, however, could take the CAP water for them, treat it, and send it right to their border using existing infrastructure. Avondale only needed to build the facilities to take the water from their border to their distribution system. This arrangement provides backup in case of a well outage, expands Avondale's portfolio of water resources, and gives them access to actual wet water.

Storage Credits

Phoenix created a number of long-term storage credits, which entitle them to recover a fixed amount of water from recovery wells. These credits were created through aquifer recharge in underground storage

Business of Water

projects within the SRP district. The City has projected that it does not have enough recovery capacity in existing wells. Through an agreement worked out recently, SRP is guaranteeing recovery capacity for Phoenix. As Campbell said, "Water efficiency, sustainability, and moving water through time; those are critically important issues for us."

Collaboration for Conservation

Another lesson Campbell shared is that collaboration is the key to shaping transactions that create efficiencies to deal with the effects of climate change, drought, and aridification. Phoenix participated with several other parties, including the Walton Family Foundation, in an agreement with the GRIC to compensate the Community for leaving 45,000 acre-feet of water in Lake Mead. Arizona and its neighbors in the Colorado River Basin are working to maintain the water level in Lake Mead through system conservation in order to prevent a shortage declaration by the US Bureau of Reclamation, which would trigger reductions in water allocations. The GRIC system conservation effort brought Phoenix no water, but the City of Phoenix is involved with funding because they believe the goal is worthwhile.

Loss of Control Fear

Campbell also learned that the idea of water transactions is scary to people. They fear loss of control and this fear makes them suspicious of transactions. "We need to find a way to allay fears about what water transactions mean," she said.

Exchange Platform

Campbell's final lesson was that transactions are wickedly complex to construct, even if the deal is simple. They often take an inefficient amount of time because of the need to assemble the rules involved in the transaction, appropriate partners, available water supplies, and infrastructure. She concluded that some type of technological tool is needed that can simplify the process. Such a tool would allow potential partners to connect with each other. Past transactions have relied too much on chance and knowing the right people. With an exchange platform, however, the right match can be found.

Ethics & Social Responsibility

Because of water's role at the foundation of human and environmental well-being, business activities relating to the use and management of water are subject to moral and ethical scrutiny. Conference speakers generally concurred that the business of water should take place within a framework that considers its ethical ramifications through space and time.

National Policy?

David Wegner faulted the US government for a failure to provide a unifying policy framework to guide state and local actions. Without a national water policy in the United States, varied legal frameworks and interpretations produce conflicts among states, and between states and the federal government. Litigation replaces what could be otherwise be a common sense approach to solving water problems. It is fair to infer that this approach elevates what is legal above what is just.

Legal v. Just

Richard Morrison of Morrison Enterprises spoke directly to the issue of ethics in water management. Behaving ethically goes beyond obeying laws to considerations of virtue. These can provide ethical benchmarks to test against what is or what may become legal. While complying with the law is necessary, the law is incomplete. Morrison suggested that thinking about public virtue within the context of water policy can provide a basis for defining ethical considerations and boundaries. One element of public virtue is the notion that "I want the same for you as I want for me." Virtue limits personal desires in favor of the needs and desires of others. This attitude can support policies that encourage sustainability and economic justice.

Public Virtue

Principles of economic justice include:

- equal respect for all involved
- special concern for the poor and the disadvantaged
- responding to basic human needs
- human freedom
- contributing to the community
- fulfilling obligations to future generations

Economic Justice Principles

These principles also provide a foundation for sustainability and planning for the long-term. Morrison warned, however, that the principles may conflict and require balancing. For example, maximizing the economic benefits from water transactions to meet the needs of people alive today may limit resources and opportunity for future generations. This can happen when water is moved for the sake of putting it to a higher valued use, thus constraining the future for people located where the water originated. He added that moving water to achieve greater efficiency in use also ignores the intrinsic value of water to a place. Moving water not only may result in a loss of habitat and ecosystem-based economic benefits, but also affect personal identities, often tied to a place. He used the example of rural Arizona, where generations have relied on local water resources to maintain their way of life.

Balancing v. Maximizing

Morrison concluded that ultimately the ethical choice, when developing policies and managing water resources, is to do no harm. This entails looking beyond win-win solutions to see the potential effects on any party that is affected by the action.

Business of Water

Cultural Values

Community Values

Moral Compass

Creating Solutions

Morrison's ideas were influenced by the widespread belief in many tribal communities that planning must include consideration of the next seven generations. GRIC Governor Lewis described the GRIC's plans to manage their water sustainably and to honor tribal traditions while participating in 21st Century water policy-making. In water planning it is important to note the cultural significance water holds for many people; water is intrinsically linked with spirituality and cultural values. Community leaders are working toward their long-term goal of restoring portions of the Gila River. To do this work, they are relying on experts while adhering to their traditions and values. "In two years, riparian wetlands have had animals come back, flora and fauna come back, you can actually see the original flow of the Gila River — it's been an emotional process for reconnecting to our Gila River — our namesake. This has been an amazing time for us," said Lewis.

This focus on community values also drove Tucson's WII program, described above, which according to Tucson Water Director Thomure, was designed to have the following outcomes: build the economy with socially and environmentally responsible businesses; build the right infrastructure at the right time and location; and build partnerships with the private sector to meet common goals.

On a broader scale, Colorado River system conservation was characterized as a moral issue. According to Lewis, the drought is not going away, and GRIC can lightly pat themselves on the back for making an important contribution to responsible water management statewide. They made water available through forbearance for system conservation in Lake Mead. Although they received some payment, it was much less than sale the credits would bring. "We've had water taken away from us. We don't want water to be taken from [others]," said Lewis. "We want to be a moral compass for water conservation," he said. "We want to make sure that we lead the way."

Further on the issue of Colorado River system conservation, ADWR Director Buschatzke's presentation reinforced the social and moral responsibility of all the Colorado Basin states to work together to prevent the system from suffering catastrophic failure. His vision for the future included: demonstration of our values; nurturing of existing and upcoming partnerships; the use of transactions to reach common goals; and a firm stance on the ethics with which we want to define who we are for the future.

Overall, Kevin Moran of the Environmental Defense Fund summed it up best by saying that when considering water policies and decisions, it is important who we choose to be and the creativity we bring along in creating solutions to our water challenges.

A Final Word

The WRRC Annual Conferences attract a broad cross-section of water professionals, academics, advocates, and the interested public. The WRRC aims to provide a forum for multiple perspectives to be heard on important water resources topics. *The Business of Water* focused on issues that are often peripheral to other major water conferences. Speakers were frank about the advantages to water management of incorporating the motivations and potential contributions of business and business approaches. They also made a strong case for framing the business of water within an ethical system that reflects the values of sustainability and justice. In the tradition of WRRC conferences, the 2018 conference provided an opportunity for learning and some food for thought in support of informed water resources discussions and decision-making.

For Additional Information:

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WRRC *The Business of Water* conference agenda website (some presentations available): https://wrrc.arizona.edu/conference-2018-agenda

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